Toward seamless weather-climate and environmental prediction

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Over the last decade or so, predicting the weather, climate and atmospheric composition has emerged as one of the most important areas of scientific endeavor. This is partly because the remarkable increase in skill of current weather forecasts has made society more and more dependent on them day to day for a whole range of decision making. And it is partly because climate change is now widely accepted and the realization is growing rapidly that it will affect every person in the world profoundly, either directly or indirectly.

One of the important endeavors of our societies is to remain at the cutting-edge of modelling and predicting the evolution of the fully coupled environmental system: atmosphere (weather and composition), oceans, land surface (physical and biological), and cryosphere. This effort will provide an increasingly accurate and reliable service across all the socio-economic sectors that are vulnerable to the effects of adverse weather and climatic conditions, whether now or in the future. This emerging challenge was at the center of the World Weather Open Science Conference (Montreal, 2014).The outcomes of the conference are described in the World Meteorological Organization (WMO) book: Seamless Prediction of the Earth System: from Minutes to Months, (G. Brunet, S. Jones, P. Ruti Eds., WMO-No. 1156, 2015). It is freely available on line at the WMO website.

We will discuss some of the outcomes of the conference for the WMO World Weather Research Programme (WWRP) and Global Atmospheric Watch (GAW) long term goals and provide examples of seamless modelling and prediction across a range of timescales at convective and sub-kilometer scales for regional coupled forecasting applications at Environment and Climate Change Canada (ECCC).